

Spot Safety Project Evaluation

Project Log # 200505108

Spot Safety Project # 14-98-021

Spot Safety Project Evaluation of the Actuated Flashing Traffic Signal Installation at the Intersection of SR 1127-(Kanuga Rd-Crab Creek Rd) and SR 1123-Little River Rd in Henderson County.

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
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Principal Investigator

Majed Bazzari

9/6/05

Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 14-98-021 – The Intersection of SR 1127-(Kanuga Rd-Crab Creek Rd) and SR 1123-Little River Rd in Henderson County.

Introduction

In an attempt to assess the safety of our roads, the Safety Evaluation Group of the Traffic Safety Systems Management Section has evaluated the above project. The methodologies used in this evaluation offer various philosophies and ideas, in an effort to provide objective countermeasure crash reduction results. A naive before and after analysis of the treatment versus comparison data has been completed to measure the effectiveness of the spot safety improvement. This information is provided to you so the benefit or lack of benefit for this type of project can be recognized and utilized for future projects.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of an actuated flashing traffic signal. SR 1127-(Kanuga Rd-Crab Creek Rd) is a two-lane facility with no left turn lanes at the intersection with SR 1123-Little River Rd. SR 1123-Little River Rd is also a two-lane facility with no left turn lanes. SR 1127 have a speed limit of 45 mph while SR 1123 have a speed limit of 35 mph. The intersection is controlled by stop signs on SR 1123. The original problem statement was angle crashes occurring at the intersection due to restricted sight distance by the vehicles entering SR 1127.

The initial crash analysis for SR 1127 at SR 1123 was completed from June 1, 1995 through May 31, 1998 with a total of 2 reported crashes. Both crashes were Left-Turn crashes, which were deemed correctable by the flasher installation. There were no class A, B or C injuries resulted from these crashes. The final completion date for the flashing traffic signal installation at the subject intersection was on May 1, 2001.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from April 1, 2001 through June 30, 2001. The before period consisted of reported crashes from July 1, 1997 through March 31, 2001 (3 years and 9 months) and the after period consisted of reported crashes from July 1, 2001 through March 31, 2005 (3 years and 9 months). The ending date for this analysis was determined by the available crash data at the time the crash analysis was completed.

The analysis also consisted of two different sets of data, the treatment and the comparison data. The treatment data consisted of all crashes within 150 feet of the subject intersection. The comparison data consisted of a sum of all crashes within 150 feet of three intersections on SR 1127: SR 1125-Walnut Cove Rd, SR 1283-Kanuga Lake Rd and SR 1138-Old Kanuga Rd.

Please see attached location map for further details.

The following data table depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. These crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	8	2	-75.0
Total Severity Index	14.2	8.4	-40.8
Frontal Impact Crashes	5	2	-60.0
Frontal Severity Index	20.6	8.4	-59.2
Volume	5500	5500	00.0
<u>Comparison Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	7	10	42.9
Total Severity Index	17.1	4.0	-76.9
Frontal Impact Crashes	2	3	50.0
Frontal Severity Index	8.4	1.0	-88.1
Volume	5100	5000	-2.0
<u>Odds Ratio: Treatment versus Comparison</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Treatment Total Crashes	8	2	-82.5
Comparison Total Crashes	7	10	
Treatment F.I. Crashes	5	2	-73.3
Comparison F.I. Crashes	2	3	

The naive before and after analysis at the treatment location resulted in a 75.0 percent decrease in Total Crashes, a 60.0 percent decrease in Frontal Impact Crashes, a 40.8 percent decrease in the Total Severity Index, a 59.2 percent decrease in the Frontal Severity Index, and a 00.0 percent change in Average Daily Traffic (ADT). The comparison locations resulted in a 42.9 percent increase in Total Crashes, a 50.0 percent increase in Frontal Impact Crashes, a 76.9 percent decrease in the Total Severity Index, an 88.1 percent decrease in the Frontal Severity Index, and a 2.0 percent decrease in ADT. The before period ADT year was 1999 and the after period ADT year was 2003.

The Odds Ratio is used as another means of calculating the treatment effect. The total crashes in the before and after period from the Comparison intersections are used to calculate the percent reduction in total crashes for the Treatment Intersection. As shown in the table above, using the Odds Ratio calculation, there is an 82.5 percent decrease in Total Crashes and a 73.3 percent decrease in Frontal Impact Crashes at the treatment intersection.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 75.0 percent decrease in Total Crashes and a 60.0 percent decrease in Frontal Impact Crashes. Using the Odds Ratio to calculate the treatment effect resulted in an 82.5 percent decrease in Total Crashes and a 73.3 percent decrease in Frontal Impact Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and Frontal Impact Crashes from the before to the after period.

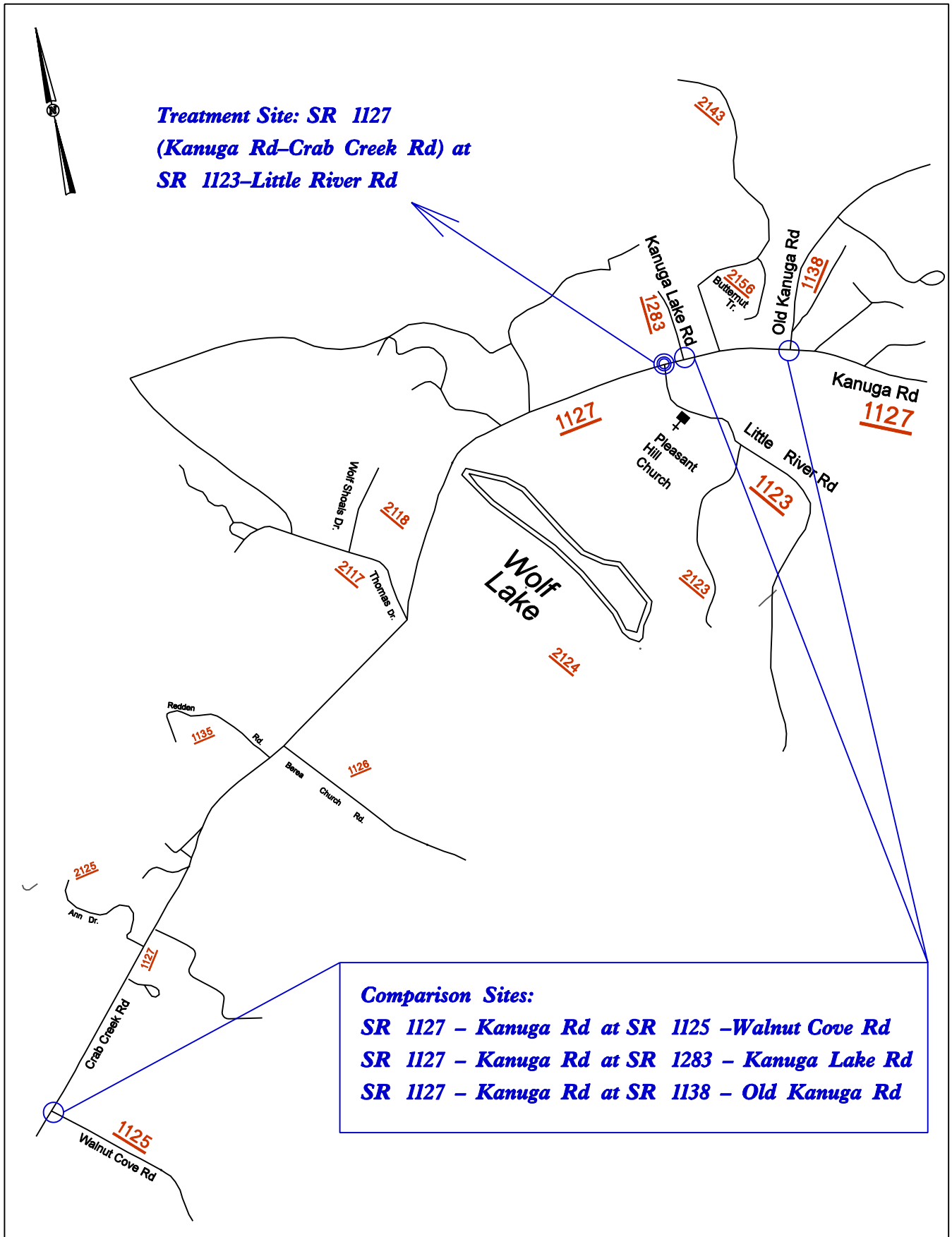
The crash reduction statistics appear significant from the before to the after period. According to the crash reports and field investigation for the treatment site there is still an existing sight distance issue. The sight distance problem exists for vehicles entering SR 1127 from SR 1123. There are tree branches on SR 1123 that limit the visibility of the over hanging flasher when approaching the treatment intersection (*Please see attached photos*). Improving the visibility of the flasher by trimming the tree branches is recommended. A further investigation into the sight distance issue may also be needed.

Additionally, White Squirrel lane is a Private Drive located close to the treatment intersection. This Drive is a one lane facility with a 20 mph speed limit that intersects with SR 1127, which serves a small residential area. From the field investigation there is also a sight distance issue on this drive due to trees, a stone wall and a crest vertical curve (*please see attached photos*).

The countermeasure crash reduction for Total Crashes at the subject intersection can be in the range of a 75.0 percent decrease to an 82.5 percent decrease in crashes. The countermeasure crash reduction for Frontal Impact Crashes at the subject intersection can be in the range of a 60.0 percent decrease to a 73.3 percent decrease in crashes. As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Evaluation of Spot Safety Project Number 14-98-021

Location Map, Henderson County



Treatment Site Photos



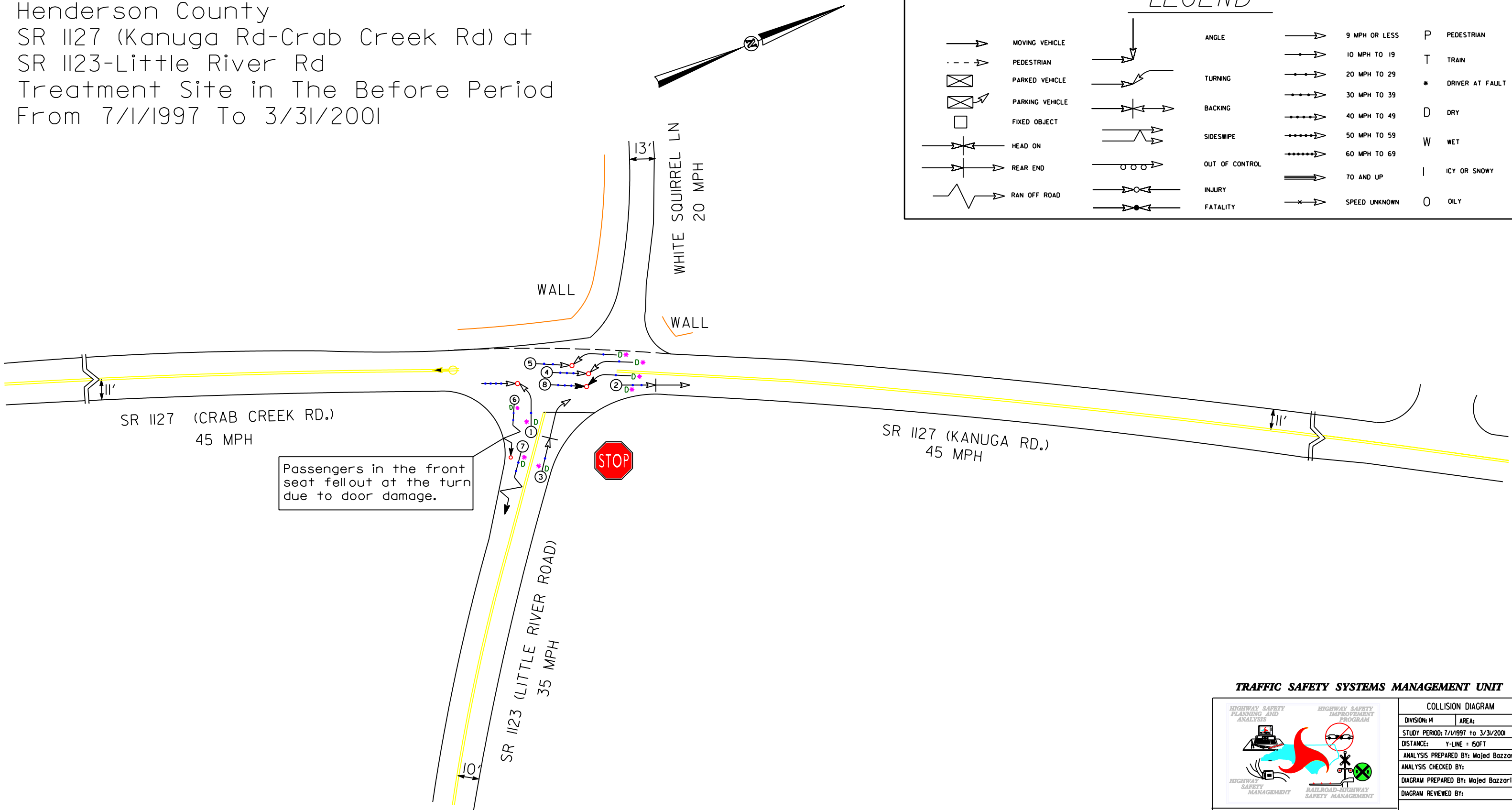
At the stop sign of SR 1123 – Little River

Treatment Site Photos

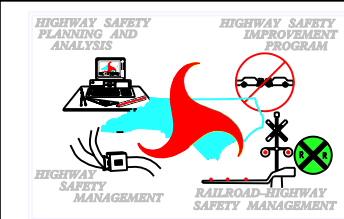


Sight Distance: SR 1123 – Little River at SR 1127 looking East

Henderson County
SR 1127 (Kanuga Rd-Crab Creek Rd) at
SR 1123-Little River Rd
Treatment Site in The Before Period
From 7/1/1997 To 3/31/2001



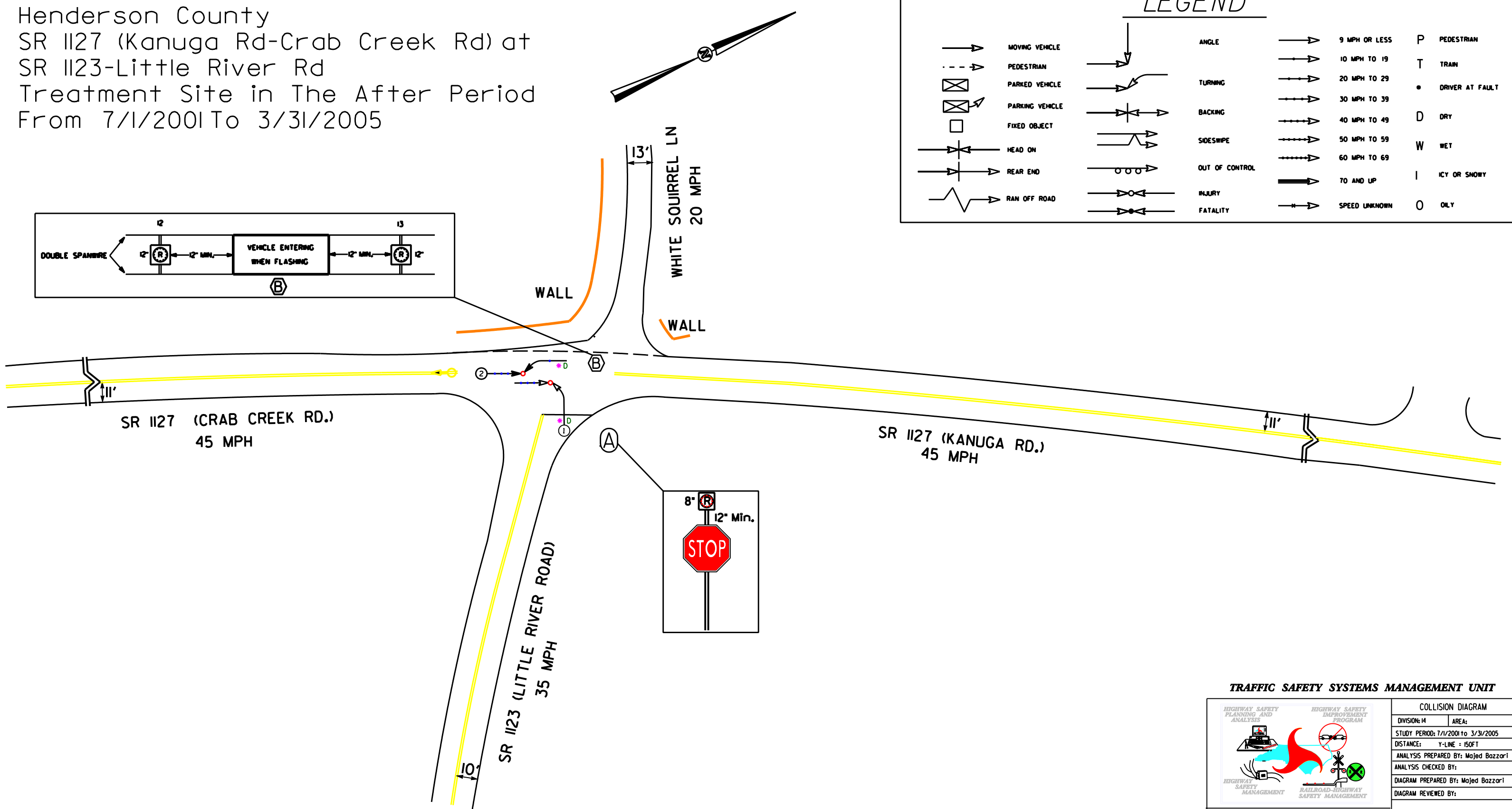
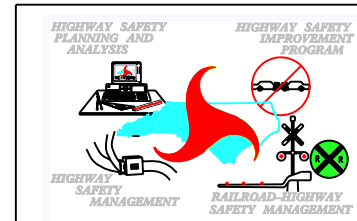
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT



COLLISION DIAGRAM	
DIVISION: 14	AREA:
STUDY PERIOD: 7/1/1997 to 3/31/2001	
DISTANCE: Y-LINE ± 150 FT	
ANALYSIS PREPARED BY: Majed Bazzari	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: Majed Bazzari	
DIAGRAM REVIEWED BY:	
SCALE: NOT TO SCALE	
DATE:	
LOG NUMBER: 200505108 SS 14-98-021	

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH

Henderson County
SR 1127 (Kanuga Rd-Crab Creek Rd) at
SR 1123-Little River Rd
Treatment Site in The After Period
From 7/1/2001 To 3/31/2005

**TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT**

COLLISION DIAGRAM	
DIVISION: 14	AREA:
STUDY PERIOD: 7/1/2001 to 3/31/2005	
DISTANCE:	Y-LINE = 150 FT
ANALYSIS PREPARED BY: Majed Bazzari	
ANALYSIS CHECKED BY:	
DIAGRAM PREPARED BY: Majed Bazzari	
DIAGRAM REVIEWED BY:	
SCALE:	NOT TO SCALE
DATE:	
LOG NUMBER: 200505008 SS 14-98-021	

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY
SYSTEMS BRANCH